

APPENDIX D

RECREATION RESOURCES

1. Authority. Section 203 of the 1968 River and Harbor Act (Public Law 90-483) authorized Federal participation in the cost of a project for improvement and protection of the shores of Dade County, Florida, by providing for a protective and recreational beach in accordance with the recommendations of the Chief of Engineers in House Document No. 335, 90th Congress, 2d Session.

2. Purpose and scope. The purpose of this appendix is to define scenic, recreational, and other ecological resources of the Dade County beach erosion project. Included are estimates of the magnitude of public use, the type of development anticipated, the location of public access, both existing and proposed, and changes needed to meet public use requirements.

3. Background. The authorized plan of improvement was based on the recommendations of a survey-scope report, Beach Erosion Control and Hurricane Protection Report for Dade County, Florida, prepared in 1965. The recommendation, as stated in the 1965 survey report is "...that a Federal project be adopted for beach erosion control and hurricane protection between Government Cut and Bakers Haulover Inlet by providing a protective and recreational beach having a dune at elevation 11.5 feet and a level berm 50 feet wide at elevation 9 feet, mean low water; for beach erosion control at Haulover Beach Park by providing a protective and recreational beach with a berm elevation of 9 feet, mean low water, and a berm width up to 50 feet; for periodic nourishment of both the above reaches; and for inclusion of the beach fill and groin previously provided at Bal Harbour and Haulover Beach Park by local interests."

DESCRIPTION OF PROJECT AREA

4. Geography of Area. The project area consists of that part of the Atlantic shoreline of Dade County north of Government Cut to the north boundary of Haulover Beach Park, a distance of 10.7 miles. It includes Miami Beach and the smaller coastal communities of Surfside and Bal Harbour. The total length of project shore fronting these communities is 9.4 miles. The project also includes the 1.3 miles fronting Haulover Beach Park. Aside from Government Cut, at the south end of the project area, Bakers Haulover Inlet, an artificial connection between Biscayne Bay and the ocean, is located within the project area. The northern part of Biscayne Bay, a shallow tidal sound, separates most of the project area from Metropolitan Miami, on the mainland. The part of the bay backing the study area has a

width ranging from 1 to 3 miles. The barrier strip occupied by Miami Beach and several other coastal municipalities varies in width from 0.2 to 1.5 miles; average width is about 0.5 mile. Elevations of the strip range from about 5 to 10 feet, mean low water. The higher elevations occur generally along the oceanside; the ground surface slopes downward toward the bay. The average elevation along the oceanside is about 10 feet.

5. Climate. The climate of Dade County is semi-tropical marine, characterized by warm humid summers and mild dry winters. Mean annual temperature is 73°F with infrequent extremes of temperature ranging from the low thirties to the high nineties. The climate is tempered by prevailing southeast winds, which bring warm moist air from the ocean, and by the Gulf Stream which passes within a few miles of the shoreline. January is usually the coldest month, averaging about 68°F and August is usually the hottest, averaging 83°F.

6. The average annual rainfall in the county ranges from about 52 inches in the western sector to as much as 60 inches along the coast. Wide differences in yearly totals have been recorded; in some years the rainfall is only 30 inches, in others, more than 100. Rainfall is unevenly distributed throughout the year; about 75 percent of the rain falls in June-October. January is usually the driest month with an average rainfall of about 2 inches; September is usually the wettest month with an average rainfall of about 8.5 inches.

7. Topography. The barrier strip occupied by Miami Beach and several other coastal municipalities varies in width from 0.2 to 1.5 miles; average width is about 0.5 mile. Elevations of the strip range from about 5 to 10 feet, mean low water. The higher elevations occur generally along the oceanside; the ground surface slopes downward toward the bay. The average elevation along the oceanside is about 10 feet, mean low water. Development on the barrier strip is on fill placed over mangrove swamps except for a narrow strip of natural high groved along the beach.

8. Existing land use and land potential. Most of the area under study is quite highly developed. The city of Miami Beach, which occupies about 70 percent of the project area, probably represents the most densely concentrated resort area of the luxury class in the world. Development north of Bakers Haulover Inlet, although not as luxurious as that south of the inlet, is still generally of the luxury class. Basically, current land use with a tendency toward higher concentration is expected over the life of the project.

9. Accessibility to project area. Access to the Dade County Beaches area is by automobile and bus. The major arteries of vehicular flow are: U.S. 195, U.S. 41, the Venetian Way, the North Bay

Causeway and the Broad Causeway. U.S. 195 provides a direct link between Miami Beach and Miami International Airport. Miami Beach is also serviced by the Metropolitan Dade County Transit Authority. The Metropolitan Dade County Transit System services the city of Miami Beach with at least seven different bus lines that connect the city of Miami Beach to the city of Miami. These buses together stop at about 20 different places within two blocks of the project beach. These stops are dispersed along the length of the Miami Beach shore and provide access to all segments of the project beach.

10. Public Access to beaches. In Florida, title to riparian property generally extends to the mean or ordinary high water line. Seaward of that line the beach and submerged bottom lands are the property of the State. Such lands are in custody of the Trustees of the Internal Improvement Fund, a State body, to be held in trust for the benefit of the people of the State. Technically, therefore, the public may not be deprived of the right of access to the beach below high water except by such lawful regulations as may be imposed in the interest of the public.

11. Access to the beaches of Dade County is provided by numerous street ends and public parks interspersed along the length of the project beach. Altogether there are 36 street ends and 11 public parks totaling 18,860 linear feet of beach, the average street end length being 50 feet and the average park length being approximately 1,525 feet.

12. Parking. The Miami Beach parking system has 56 off-street metered facilities, providing 6,437 metered stalls. Twenty-five of these facilities, accounting for 2,659 metered stalls, are shown on plat B-1. The system also includes 4,368 on-street metered spaces. The town of Surfside has 6 off-street metered facilities, providing 407 metered stalls and 250 on-street metered spaces. The town of Bal Harbour has one off-street metered facility, providing 60 metered stalls and 12 on-street metered spaces.

PROJECT DATA

13. Design beach. The project design beach would provide and preserve an adequate recreational beach to meet future demands and, in addition, provide protection for upland property and structures. The beach would be constructed by placing initial fill material along the 10.7 miles of shore in the reach between Government Cut and the north end of Haulover Beach Park with periodic nourishment as needed. A protective beach and a dune will be provided for the reach between Government Cut and Bakers Haulover Inlet. A protective beach only will be provided for Haulover Beach Park.

14. Pertinent data. The restored beach would be of such dimensions as required to dissipate wave energy seaward of upland property and existing structures and provide adequate area for recreational bathing. The restored beach would have a dune at elevation 11.5 feet and a level berm 50 feet wide at elevation 9 feet, mean low water between Government Cut and Bakers Haulover Inlet and a 50-foot wide berm of elevation 9 feet, mean low water, at Haulover Beach Park. Seaward slope of the restored Beach, as shaped by wave action, would be about 1 on 20 from berm crest to mean low water, and 1 on 40 from mean low water to intersect with existing bottom. These project dimensions will provide a dry recreation beach 180 feet wide above mean high water and oceanward of the dunes. The estimated volume of material required for initial restoration is about 13.5 million cubic yards. Periodic nourishment of the 10.7-mile restored beach would be provided when needed. The average annual nourishment requirement for the project beach is north of Bakers Haulover Inlet is 20,000 cubic yards and 190,000 cubic yards south of Bakers Haulover Inlet.

OUTDOOR RECREATION ATTENDANCE

15. Total participation. The total participation in ocean swimming in Dade County was determined by multiplying resident population and tourist projections by their respective participation rates. The participation rates were derived from tables 7-2, 7-3 and 7-4 of Outdoor Recreation in Florida, a 1971 publication of the State of Florida. These rates are presented in table D-1. The population projections are OBERS series C projections for SMSA's. They are presented in table D-1 and figure D-1. The tourist projections are from an August 30, 1968, publication of the Florida Social Science Advisory Committee and are shown in table D-1 and figure D-2.

16. Allocation of participation. The total participation in ocean swimming in Dade County was allocated to the available beach using available information. The 1970 participation at beach areas within the project beach for which beach counts were taken was 35.64 percent of total participation. It has been assumed that this percentage will remain constant over the life of the project. Future participation at these beach areas has been determined by multiplying total participation by .3564. Participation at these beach areas is shown on table D-1 and figure D-3.

17. The available beach in Dade County includes the authorized Key Biscayne and Virginia Key Beach Erosion Control Project, which was completed in July 1969. A section 103 study completed for the lower end of Key Biscayne is awaiting local assurances for implementation. Participation claimed at these beaches in the project reports has been subtracted from total participation. Participation at these

beaches is shown in table D-1 and figures D-3 and D-4. The remaining participation in ocean swimming in Dade County (i.e. total participation less 35.64 percent of total participation and participation allocated to Key Biscayne and Virginia Key) was allocated to the remaining available beaches on the basis of length. The remaining beach areas within the project beach constitute approximately 66 percent of remaining available beach. Sixty-six percent of remaining available participation has, therefore, been allocated to the project beach. Total projected participation at the project beach is shown on table D-1 and figure D-5.

RECOMMENDED PLAN OF DEVELOPMENT

18. Type of recreation facilities. Current outdoor recreational activities along the 10.7 miles of the Dade County beach erosion control project consists of swimming, sunning, picnicking, surfing, fishing and sightseeing. These are the activities desired by the users of the beaches and it is expected that with the project even more people will come to enjoy the beaches. The city of Miami Beach owns and maintains approximately 25 percent of the ocean shoreline within the city for use as public parks.

19. Initial and future recreation development. The project will consist mainly of sand fill which will provide a 180-foot-wide recreational beach at mean high water and periodic nourishment of the filled beach as needed to compensate for erosion losses. This protective and recreational beach will facilitate additional recreational and tourist activity. Excessive erosion and shoreline recession that has greatly reduced the available protective and recreational beach has, and in the absence of the project, will continue to constrain the utility derivable from recreational activities.

TABLE D-1

Projected Attendance at Project Beach

ITEM	YEAR				
	1970	1980	1990	2000	2030
Dade County Population	1,278,200	1,546,300	1,954,500	2,364,900	3,488,000
Resident Participation Rate	9.22	9.22	9.22	9.22	9.22
Dade County Tourists	2,788,000	2,969,000	3,130,000	3,298,000	3,615,000
Tourists Participation Rate	4.96	4.96	4.96	4.96	4.96
Total Participation	25,564,000	28,963,000	33,591,000	38,162,000	50,090,000
35.64% of Total Participation	9,112,000 ¹	10,330,000	11,972,000	13,601,000	17,852,000
Participation at Key Biscayne (south)	950,000	1,260,000	1,990,000	2,900,000	3,820,000
Participation at Key Biscayne (north) and Virginia Key	5,150,000	6,880,000	6,880,000	6,880,000	6,880,000
Total Remaining	10,352,000	10,493,000	12,749,000	14,781,000	21,538,000
66% of Total Remaining	6,840,000	6,933,000	8,424,000	9,766,000	14,230,000
Total Allocated to Project Beach	15,952,000	17,263,000	20,396,000	23,367,000	32,082,000

¹ Source: Miami Beach Patrol Division and Dade County Beach and Marine Safety Division.

PROJECT RECREATION BENEFITS

20. General. Estimated recreational benefits are based on the preservation of, or the increase in, the use of shorefront recreational facilities that would be possible and expected with the project. Evaluated benefits are limited to those accruing to beaches considered for improvement. In accordance with EM 1120-2-108, a value of \$1.00 was used for each visit to the study area. EM 1120-2-108 dated 23 December 1960 proposed the use of either \$0.25, \$0.50 or \$0.75 per user-day depending on the category of beach being analyzed. The project beach is considered to be a publicly owned beach with full development and was assigned a visitation value of \$0.75 based on paragraph 6b.3 of the EM. The beach provides practically every recreational service and convenience, including lifeguards, shower facilities, restrooms, parking areas, concession stands and picnic areas. Considering increases in the price level, as reflected by increases in the consumer price index, since the date of this EM the present unit value per recreation day should be \$1.06. Therefore \$1.00 per user-day for beach visitation was used.

21. Daily beach use. Historical patterns of beach use at Haulover Beach Park and at public parks in Miami Beach cannot be accurately characterized by dividing beach use into peak day use, lesser peak day use, Sunday use and weekday use. Consequently, the following method has been employed to establish the probable future pattern of beach use at the project beach. FY-73 attendance figures at public parks in Miami Beach were ranked in descending order. The difference between consecutive attendance figures was then compared to 10 percent of the average attendance. If this difference was less than 10 percent of the average, the two attendance figures were grouped together and the comparison was repeated using the first attendance figure and the attendance figure next in magnitude to the second attendance figure, etc. If the difference was greater than 10 percent of the average, the smaller attendance figure was used as the starting point for the formation for the next group. In total, 25 groups were formed yielding 25 different use categories. The average attendance figures for each group and the number of attendance figures in each group were determined. Each average attendance figure was then divided by the total annual attendance and the resulting percentages were used to separate future annual attendance at the project beach into different beach uses (the number of days in each use being equal to the number of attendance figures in the associated group.)

22. Projected beach capacity. Estimates of beach capacity with and without the project as given in table D-2 and figure D-6 consider the length of available beach from Government Cut on the south to the north end of Haulover Beach Park. The capacity of the beach was determined by allowing 75 square feet of beach area for each beach use and assuming a turnover rate of 2. Estimates of the with project beach capacity are based on a 180-foot-wide beach at mean high water. Estimates of the without project beach are based on an erosion rate of 1.4 feet per year.

23. Recreation benefit computations. The recreation benefits attributable to the Dade County Beach Erosion Control Project are the increase in use and the reduction in overcrowding with the project. The overcrowding benefit for each different beach use (OB) was determined by solving the following equation: $OB = (U - C)V$ where U is current attendance, C is capacity without the project and V is the value per user-day. The benefit due to increased use for each type of beach use (UB) was determined by solving the following equation: $UB = (PA - UV)$ where PA is projected attendance, U is current attendance and V is the value per user-day. In cases where projected attendance exceeds with project capacity, with project capacity replaces projected attendance in the equation above. These benefits are shown in table D-2 and figure D-7. Future benefits were discounted and amortized at an interest rate of 3-1/4 percent. The average annual increased use benefit is 6,875,000. The average annual overcrowding benefit is 7,500,000. The average annual overcrowding benefit is a measure of the benefits attributable to the project if there is no increase in visitations at the project beach. The total average annual recreation benefit attributable to the project is 14,375,000.

24. The analysis of the recreation benefits attributable to the project does not consider future increases in per capita visitation as a result of increases in household income. Due to the high B/C ratio these additional benefits have not been claimed.

TABLE D-2

Projected Beach, With and Without Project

ITEM	YEAR					
	1980	1990	2000	2010	2020	2030
<u>Public parks</u>						
With project beach (sq.ft.)	3,017,000	3,017,000	3,017,000	3,017,000	3,017,000	3,017,000
Without project beach (sq.ft.)	1,047,000	789,000	515,000	295,000	119,000	30,000
<u>Rest of project beach</u>						
With project beach (sq.ft.)	7,860,000	7,860,000	7,860,000	7,860,000	7,860,000	7,860,000
Without project beach (sq.ft.)	1,075,000	677,000	372,000	192,000	122,000	96,000
<u>Benefits attributable to project</u>						
Increased use benefit	824,000	3,500,000	6,950,000	11,145,000	15,093,000	15,236,000
Overcrowding benefit	2,197,000	4,554,200	8,050,000	11,370,000	13,624,000	14,730,000

